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EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/534,855	MAHIEU, MICHEL	
	Examiner	Art Unit	
	MICHAEL R. VAUGHAN	2431	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 December 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *45-85* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *45-85* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *5/13/05* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

The instant application having Application No. 10/534,855 is presented for examination by the examiner. Claims 45-85 are remaining for examination.

Applicant's arguments filed 12/05/08 have been fully considered but they are not persuasive. Specifically Applicant has alleged that the cited prior art does not teach (i) initializing a state with a sound value, (ii) changing a states to an unsound value, and (iii) a set of behavioral rules from the standpoint of the operation and security side. Examiner respectfully disagrees. Examiner finds statements alleging that the prior art fails to disclose a limitation "in the meaning of the claimed invention" as an improper narrow interpretation based on not limitations found in the claims but rather imposed limitations from the specification. Imposing narrow interpretations of claimed limitations based on the specification's limitation is not proper. If it is intended that a claim be narrowly interpreted in such a way, those limitations need to be added into the claims themselves. Examiner has interpreted the claims as broadly as possible based on the each and every word found in the claims.

As per allegation (i) above, Sung-Do Chi et al., hereinafter Sung, discloses on page 322 a basis for which his system expounds from. Sung teaches an intrusion model can be classified with four states, cool, warm, hot, and cool down. Here, Sung introduces the concept of assigning states to components within the system. Sung goes on to teach about transitions which dictate state changes (pg. 323). These

transitions, also referred to as phases, are analogous to the states of the claimed invention. Sung does not explicitly teach each component being initialized to a state but that is obvious in view of Apostal. Sung does teach that initial conditions for simulation can be setup for each node (pg. 331). Apostal teaches each component of a network analyzer is maintained, thus each phase must inherently have a first state. The word sound in the claim can be broadly interpreted as meaning valid, proper, or safe as an example.

As per allegation (ii), in Fig. 5, Sung explicitly shows each component, attacker, and analyzer has transition functions. These 'phases' [states], such as passive or busy, are equivalent to a sound states. In other words a passive state or busy state is an acceptable or valid state to be in. Applicant has argued that the "state" in Sung relates not to a condition but rather a detail of the component. Examiner disagrees with this analysis of Sung. Sung discloses on page 325 that the state **variables** are service type, H/W type, and O/S type. These are variables of the states, not the states themselves. The states are listed in the Fig. 5 as phases such as passive or busy. With respect to changing to an unsound state, there are Examiner finds two similar interpretations of Sung which meet this limitation. First, in the context of Fig 5, specifically when dealing with running the simulation, if a phase is not in the expected phase, it could be considered that an attack has altered the "state" of the system and therefore the state is unsound or invalid. This interpretation is in alignment with the foundation Sung set forth with states of the system being hot, cool, and warm, etc. Second, Sung also teaches each node [component] can be attributed a vulnerability

value. The vulnerability value represents the total number of attacks and successful attacks on each node. It can be readily seen that a relatively high vulnerability value would constitute an unsound value of the state of that node (pg 331). In this interpretation state is not just the phase but the overall condition of the node.

As per allegation (iii), Examiner finds support for this limitation on page 325. Behavioral rules can be interpreted as how something is supposed to behave given a particular stimulus. This is equivalent to the consequence of a given input. Sung teaches this on page 325 as monitoring is running (consequence). The system is setup knowing how the network should react to a given input. Through monitoring and analyzes, Sung teaches covering two aspects of the behavioral rules. The first aspect is analogous to the claims operation of the system limitation. In particular, Sung teaches that components are governed by phase transitions. These phases dictate the operation of system. If one of those operations is broken, the second aspect is prevalent. The system analyzes the vulnerability of the nodes. This is analogous to the security standpoint of the system. The idea meets the (iii) limitation of the claim.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 45-82 are rejected under 35 U.S.C. 101 based on Supreme Court precedent and recent Federal Circuit decisions, a 35 U.S.C § 101 process must (1) be tied to a particular machine or (2) transform underlying subject matter (such as an article or materials) to a different state or thing. In re Bilski et al, 88 USPQ 2d 1385 CAFC (2008); Diamond v. Diehr, 450 U.S. 175, 184 (1981); Parker v. Flook, 437 U.S. 584, 588 n.9 (1978); Gottschalk v. Benson, 409 U.S. 63, 70 (1972); Cochrane v. Deener, 94 U.S. 780,787-88 (1876).

An example of a method claim that would not qualify as a statutory process would be a claim that recited purely mental steps. Thus, to qualify as a § 101 statutory process, the claim should positively recite the particular machine to which it is tied, for example by identifying the apparatus that accomplishes the method steps, or positively recite the subject matter that is being transformed, for example by identifying the material that is being changed to a different state.

Here, applicant's method steps are not tied to a particular machine and do not perform a transformation. Thus, the claims are non-statutory.

The mere recitation of the machine in the preamble with an absence of a machine in the body of the claim fails to make the claim statutory under 35 USC 101. *Note the Board of Patent Appeals Informative Opinion Ex parte Langemyer et al.*

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 45-85 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As per claims 45 and 83, "the one hand", "the specification", the architecture", "the system", "the other hand", "the operation", "the standpoint", "the component", and "the simulation" all lack antecedent basis. A set of components is defined but then a reference to said component is made. This should recite said set of components. Further problems arise when a component or the component is referenced.

The phrase "and/or" is indefinite because of its dual meaning of alternative or additional. This claim is very difficult to determine the scope due to all of these problems. The dependent claims should also be checked to make sure the antecedent bases are all definitive. The dependent claims are likewise rejected for at least the same reason as claims 45 and 83. Appropriate correction is required.

As per claim 46, the phrase "may also be" renders the claim indefinite.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 45-48, 52, 53, 55, and 83 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sung et al. in view of Apostal D et al.

With respect to claim 45, Sung teaches the limitation of a "modeling phase, comprising on the one hand the specification of the architecture of the information system with a graphical representation of a set of components of the system and relations between said components, each component being associated with at least one state initialized with a sound value, the relations between two determined components comprising propagation relations able to convey attacks, and on the other hand the specification of a set of behavioral rules, from the standpoint of the operation of the system and from the standpoint of security, associated with the components of the system, each behavioral rule comprising one or more predicates and/or one or more actions" (page 321, lines 10-18) as the network security modeling and cyber attack simulation employing the advanced modeling and simulation concepts that supports a hierarchical and modular modeling environment, which (page 323, lines 7-14) consists of a system entity structure (SES) and model base (MB). The SES represents the knowledge of decompositions, taxonomies, coupling specification and constraints. The model base contains models that are procedural in character, expressed in discrete event system specification formalism. Furthermore (page 325, lines 18-20) dynamics of the component models can be represented in various ways according to their respective state variables. Finally, Sung discloses the graphical representation (Fig. 8; page 331,

lines 1-8) as SECUSIM system where users can set up initial conditions for simulation by using windows of each node.

In addition, Sung discloses the limitation of "a simulation phase, comprising the specification and the simulation of potential attacks against the information system, a successful attack causing a state of a component to pass to an unsound value" (page 327, lines 10-12) as the attacker model outputs a sequence of attacking commands according to its attacking scenario and (page 327, lines 19-23) he analyzer model can determine the number of successful attacks.

It is noted, however, that Sung does not explicitly teach the limitation of "each component being associated with at least one state initialized with a sound value."

On the other hand, Apostal teaches the abovementioned limitation (page 218, right column, lines 23-25) as the server allows client to view the state of nodes and resources.

It would have been obvious to one of the ordinary skill in the art at the time of the invention to incorporate teachings of Apostal into the system of Sung to provide means for storing additional information about the network and its components.

With respect to claim 46, Sung teaches the limitation of "a name [service type] being associated with each component one or more adjectives [execution of each phrase] may also be associated with said component, which adjectives make it possible to designate said component without naming it" (pg. 326, Fig 5).

With respect to claim 47, Sung teaches the limitation of "determined states are associated with each component of the information system, each state being able to take a sound value [phases] and one or more unsound values" (pg. 326, Fig 5) as the server allows client to view the state of nodes and resources and (pg 331).

With respect to claim 48, Sung teaches the limitation of "certain at least of said states pertain respectively to the activity, the confidentiality, the integrity and/or the availability of the component with which they are associated" (pg 326, Fig. 5).

With respect to claim 52, Sung teaches the limitation of "the relations between any two determined components comprise service relations making it possible to designate a component on the basis of another component" (page 325, lines 17-20) as network component model comprises various services such as Telnet, Email, Ftp, Web, and Packet Filtering. The dynamics of these component models can be represented in various ways according to their respective stated variables.

With respect to claim 53, Sung teaches the limitation of "the behavioral rules comprise rules for propagating attacks, these rules being for example implemented in components which are vectors of attacks, and rules for absorbing attacks, these rules being for example implemented in components which are the target of attacks" (page 327, lines 10-12) as the attacker model outputs a sequence of attacking commands according to its attacking scenarios.

With respect to claim 55, Apostal teaches the limitation of "at the end of the modeling phase, the construction of a local routing table, making it possible to direct an attack from a start component to a finish component" (page 216, right column, lines 26-29) as map table that holds locations and size information for elements (nodes and network segments) that are drawn on the network map.

With respect to independent claim 83, it is rejected in view of the same reasons as stated in the rejection of independent claim 45.

Claims 49-51 and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sung et al. "Network security modeling and cyber attack simulation methodology." Information Security and Privacy. 6th Australian Conference, ACISP 2001, 07/11/01, pages 320-333 in view of Apostal D et al "Checkmate network security modeling." Proceedings DARPA Information Survivability Conference and Exposition II. 06/12/01, pages 214-226, vol. 1 as applied to claim 45, and further in view of Ritchey at al. "Using model checking to analyze vulnerabilities." Proceedings of the 2000 IEEE Symposium on Security and Privacy. 05/14-17/2000, pages 156-165.

With respect to claim 49, it is noted that neither Sung nor Apostal explicitly teach the limitation of "an alleged name may be associated with any determined component, in particular in the case where said determined component is a usurper."

On the other hand, Ritchey teaches the abovementioned limitation (page 162, left column, lines 43-46) as Hostid is sequentially assigned to each host and is used to index into the row and column of the connectivity matrix. The attacker is assigned hosted one, so the Hostid numbering starts at two.

It would have been obvious to one of the ordinary skill in the art at the time of the invention to incorporate teachings of Ritchey into the system of Sung and Apostal to provide a straight-forward method of determining whether a host can communicate with another host.

With respect to claim 50, Ritchey teaches the limitation of "a link to another component may be associated with any determined component, in particular in the case where said determined component is usurped and where said other component is a usurper" (page 162, right column, lines 36-41) as the connectivity matrix is used to determine whether a host can communicate with another host. The host ids for the source and destination hosts are used to index into the row and column of the matrix to determine if communication is possible.

With respect to claim 51, Ritchey teaches the limitation of "the propagation relations are bidirectional relations able to convey attacks in both directions" (page 160, right column, lines 34-40) as in our SMV example we have modeled connectivity with a Boolean matrix that has the distinct disadvantage of not allowing our model to describe partial connectivity. This choice was made to simplify the example. It would be an easy

task to add a richer connectivity description to our method that includes common network connectivity details such as port numbers.

With respect to claim 54, it is noted that neither Sung nor Apostal explicitly teach the limitation of "the behavioral rules comprise binary rules, for example Boolean logic conditions giving a value of type yes/no, and/or functional rules, for example logic conditions involving a routing action (for a propagation rule) or contagion action (for an absorption rule)."

On the other hand, Ritchey teaches the abovementioned limitation (page 163, left column, lines 11-13) as an exploit is described by a case statement that determines whether all of the prerequisites for the exploit have been met.

It would have been obvious to one of the ordinary skill in the art at the time of the invention to incorporate teachings of Ritchey into the system of Sung and Apostal to provide a better way to determine the severity and probability of the system's exploits.

Claims 56, 57, 59-61, 67-69, 71-73, 84, and 85 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sung et al. "Network security modeling and cyber attack simulation methodology." Information Security and Privacy. 6th Australian Conference, ACISP 2001, 07/11/01, pages 320-333 in view of Apostal D et al "Checkmate network security modeling." Proceedings DARPA Information Survivability Conference and Exposition II. 06/12/01, pages 214-226, vol. 1 as applied to claim 55 above, and further in view of Gupta et al. (US 7,289,456 B2).

It is noted that neither Sung nor Apostal teach the limitation of "the local routing table is generated automatically according to the principle of the shortest path between the start component and the finish component."

On the other hand, Gupta teaches the abovementioned limitation (column 13, lines 47-59) as the routing engine will determine multiple paths between the two routing nodes. Specifically, the routing engine may determine a shortest path and one or more alternate shortest paths (i.e., a second, third, etc. alternate shortest path), using for example, the Dijkstra Algorithm. The former determination can be performed by first determining a shortest path to the destination node and by then determining alternate shortest paths by determining a shortest path to each of the destination node's neighboring routing nodes.

It would have been obvious to one of the ordinary skill in the art at the time of the invention to incorporate teachings of Gupta into the system of Sung and Apostal to provide more efficient network model.

With respect to claim 57, Apostal teaches the limitation of "the attacks simulation step comprises the updating of the state of a component of the system altered by a successful attack" (page 220, lines 2-6) as the Checkmate server evaluates the attack action and applies the effects of that action to the model network. The possible effects of an attack action include changing the state of a node or protocol.

With respect to claims 59 and 60, Apostal teaches the limitations of "the attacks comprise elementary attacks corresponding to unsound state values" and "the attacks further comprise a special usurping attack" (page 219, left column, lines 9-13) as an attacker can send commands that simulate requests for service functionality, that change services or nodes, and that exploit vulnerabilities.

With respect to claim 61, Apostal teaches the limitation of "an attack is defined, in particular, by a type of attack, a type of protocol, and attack path elements" (page 218, left column, line 20 – right column, line 1) as each role has associated with it a number of characteristics including: a set of nodes to attack, a set of nodes to defend, a set of mission objectives, a set of initial resources, and a level of programming ability.

With respect to claim 67, Sung teaches the limitation of "the attacks are defined in a language using the same words as a language in which the behavioral rules are defined" (page 325, lines 5-8) as the experimental frame concept may be suitably utilized to couple with a given network model, generates input external events (cyber attack commands), monitor its running (consequences), and process its output (vulnerability).

With respect to claim 68, Sung teaches the limitation of "the modeling phase and/or the simulation phase are implemented by a user by means of a man/machine interface comprising a multiview functionality, wherein a graphical representation of the

system is presented to the user as several views" (page 331, lines 1-8) as a network security simulation system where users can set up initial conditions for simulation by using windows of each node. The can also try to test various cases by attaching attacker and analyzer to any particular node. Procedures of simulation can be checked by the packet-based animation and more detailed procedures can be checked through given windows.

With respect to claim 69, it is rejected in view of the same reasons as stated in the rejection of claim 68.

With respect to claim 71, it is noted that neither of Sung, Apostal, and Gupta teach the limitation of "the behavioral rules for the components belonging to a view do not call by name upon components belonging to another view."

On the other hand, examiner takes the official notice that isolation of the elements is in the network system is not a novel concept and therefore, it would have been obvious to one of the ordinary skill in the art to provide no other ways for components to reference each other, other than through the information defined in the routing table controlled by the administrator to improve the security of the system.

With respect to claims 72 and 73, they are rejected in view of the same reasons as stated in the rejection of claim 68.

With respect to claims 84 and 85, they are rejected in view of the reasons stated in the rejection of claim 68.

Claim 58 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sung et al. "Network security modeling and cyber attack simulation methodology." Information Security and Privacy. 6th Australian Conference, ACISP 2001, 07/11/01, pages 320-333, Apostal D et al "Checkmate network security modeling." Proceedings DARPA Information Survivability Conference and Exposition II. 06/12/01, pages 214-226, vol. 1, and Gupta et al. (US 7,289,456 B2) as applied to claim 57 above, and further in view of Dowd et al. (US 7,315,801 B1).

With respect to claim 58, it is noted that neither of Sung, Apostal, or Gupta teach the limitation of "the simulation phase furthermore comprises the building of a file or journal of the attacks, containing the log of the changes of the state of the components consequent upon successful attacks, in particular to allow subsequent processing by a user."

On the other hand, Dowd teaches the abovementioned limitation (column 14, lines 11-13) as the security modeling system includes a log or a recorder which allows the system to play back the moves of an attacker or defender or both.

It would have been obvious to one of the ordinary skill in the art at the time of the invention to incorporate teachings of Dowd into the system of Sung, Apostal, and Gupta

because the system logs would provide the ability for the administrator to examine data retroactively.

Claims 62-66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sung et al. "Network security modeling and cyber attack simulation methodology." Information Security and Privacy. 6th Australian Conference, ACISP 2001, 07/11/01, pages 320-333, Apostal D et al "Checkmate network security modeling." Proceedings DARPA Information Survivability Conference and Exposition II. 06/12/01, pages 214-226, vol. 1, and Gupta et al. (US 7,289,456 B2) as applied to claim 61 above, and further in view of Cohen et al. (US 6,952,779 B1).

With respect to claim 62, it is noted that neither of Sung, Apostal, or Gupta explicitly teach the limitation of "the attack path elements comprise a start component, a finish component, a target component, and as appropriate one or more intermediate components."

On the other hand, Cohen teaches the abovementioned limitation (column 7, lines 1-2) as the system simulates attacks through the network topology from each start point to each end point.

It would have been obvious to one of the ordinary skill in the art at the time of the invention to incorporate teachings of Malan into the system of Sung, Apostal, and Gupta to provide a better security by quickly and robustly correlating the statistics collected from the network to reconstruct the path of the attack.

With respect to claim 63-66, Cohen teaches the limitations of " the list of components already traversed by an attack is saved in one or more upstream stacks", "the upstream stacks comprise a stack containing the exhaustive list of all the components traversed, designated by their real name", "wherein the upstream stacks comprise a stack containing the list of only those components traversed which are opaque, designated by their real name or, as appropriate, by their alleged name", and "the list of destination components of an attack is saved in at least one downstream stack" (column 7, lines 25-35) as the attack simulation commences from a specified attack starting point. The system then loops through a moving front-line algorithm by repeatedly evaluating the constraints for every state/graph node that has not yet been reached. The moving front-line algorithm continues adding edges to new graph nodes until no more states/graph nodes can be reached at which point the process terminates.

Claims 70 and 74-76 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sung et al. "Network security modeling and cyber attack simulation methodology." Information Security and Privacy. 6th Australian Conference, ACISP 2001, 07/11/01, pages 320-333 in view of Apostal D et al "Checkmate network security modeling." Proceedings DARPA Information Survivability Conference and Exposition II. 06/12/01, pages 214-226, vol. 1 and Gupta et al. (US 7,289,456 B2) as applied to claim 68 above, and further in view of Pitchaikani et al. (US 6,061,505).

With respect to claims 70, it is noted that neither of Sung, Apostal, and Gupta explicitly teach the limitation of "the function of interconnection between the components included in two distinct views is ensured only via the common component or the common components shared by the two views" (column 10, lines 48-54) as each view record of view records includes information about a given logical view, and is connected by a plurality of pointers to a plurality of view device records. Each view device record of view device records contains an index that indicates which device interface exists in a particular logical view. Furthermore, (column 11, line 7) to represent this relationship between various views, a plurality of pointers associates each view record of view records that represents a view having a subview with the view records in view records which represent the one or more subviews. Where subview can be a view of the station alone.

It would have been obvious to one of the ordinary skill in the art at the time of the invention to incorporate teachings of Pitchaikani into the system of Sung, Apostal, and Gupta to create a logical topology map of the network.

With respect to claims 74 and 75, it is rejected in view of the same reasons as stated in the rejection of claim 70.

With respect to claim 76, Pitchaikani teaches the limitation of "the modeling phase further comprises the specification of one or more basic metrics associated respectively with the components" (Table 5; column 11, line 53 – column 12, line 5) as

database includes TopoMonitor records, polling records, location records, describe records, ExtView Info records, AppSpecificinfo records, Mgmt Addr records, etc.

Claims 77-82 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sung et al. "Network security modeling and cyber attack simulation methodology." Information Security and Privacy. 6th Australian Conference, ACISP 2001, 07/11/01, pages 320-333 in view of Apostal D et al "Checkmate network security modeling." Proceedings DARPA Information Survivability Conference and Exposition II. 06/12/01, pages 214-226, vol. 1, Gupta et al. (US 7,289,456 B2), and Pitchaikani et al. (US 6,061,505) as applied to claim 76 above, and further in view of Swiler et al. (US 7,013,395 B1).

With respect to claim 77, Sung teaches the limitation of "the basic metrics comprise a metric of effectiveness of parries, a metric of effectiveness of detection of attacks, and/or a metric of the means of an attacker" (page 327, lines 19-22) as the analyzer model is designed to gather the statistics and analyze the performance index such as the vulnerability of each component on given network. For the simulation convenience, we have defined the component vulnerability as the number of successful attacks divided by the total number of attempted attacks.

In addition, Swiler further teaches the abovementioned limitation as (column 7, lines 7-11) as the attack template also contains an edge weight. When the template is instantiated, it returns a value that is the weight on the edge in the attack graph. The

value may represent time for the attack to succeed, cost to the attacker, etc., depending on which metric the user chooses. Furthermore, (column 9, lines 56-64) each node in the graph contains information about what user privileges the attacker has obtained, extra vulnerabilities not implied by the privilege level, and the shortest distance from the start to the current node. Distance, in this case relates to the edge weight functions in the attack templates and represents such considerations as estimated time, cost, degree of effort, and likelihood of detection of the attack.

It would have been obvious to one of the ordinary skill in the art at the time of the invention to incorporate teachings of Swiler into the system of Sung, Apostal, Gupta, and Pitchaikani to provide the extensive view of the attack paths and advantages gained by the attacker.

With respect to claims 78-82, they are rejected in view of the same reasons as stated in the rejection of claim 77.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL R. VAUGHAN whose telephone number is (571)270-7316. The examiner can normally be reached on Monday - Thursday, 7:30am - 5:00pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kim Vu can be reached on 571-272-3859. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. R. V./

Examiner, Art Unit 2431

/Syed Zia/

Primary Examiner, Art Unit 2431